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ABSTRACT

An experiment, which replicates an earlier study conducted in Sweden, was performed to study the effects of prior knowledge of relevant subject matter on reading comprehension and on memory. Fifty college students read one of two contrasting passages that presented two opposing points of view after they had recorded their beliefs about the subject discussed in the passages. These beliefs were analyzed for their truth value, their factual correctness, and the degree to which they effectively discriminated between the two points of view. Tests of comprehension and recall were administered. According to stepwise regression analysis, the discriminability of the subjects' beliefs contributed more to comprehension than recall of the texts or verbal ability. Analyses of the relationships between recall and comprehension produced inconsistent results. Errors of comprehension occurred more frequently because false statements about the text were accepted than because true statements were rejected. Differences between the specific aspects of world knowledge studied in this experiment and previous work with more general aspects were discussed. (Author/CTM)

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WORLD KNOWLEDGE AND THE RECALL AND COMPREHENSION OF TEXT

by
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WORLD KNOWLEDGE AND THE RECALL AND COMPREHENSION OF TEXT*

Schultz**, C.B., and Waern, Y. World knowledge and the recall and comprehension of text, Rep. Dep. Psychol., Univer. Stockholm, 1978, No. 533. - Detailed aspects of world knowledge were examined for their effects on memory and comprehension. Fifty subjects read one of two contrasting passages after registering their beliefs about the subject of the texts. Beliefs were analyzed for their truth value and discriminability. Tests of comprehension and recall were administered. According to stepwise regression analysis, the discriminability of the subjects´ beliefs contributed more to comprehension than recall of the texts or verbal ability. Analyses of the relationships between recall and comprehension produced inconsistent results. Errors of comprehension occurred more frequently because false statements about the text were accepted than because true statements were rejected. Differences between the specific aspects of world knowledge studied here and previous work with more general aspects were discussed.

Introduction

The knowledge the reader brings to a text may be as important for understanding it as the information contained in the text. This claim is not a new one, of course, and it has been partially substantiated. How well the reader comprehends a passage is determined by contextual features, whether they are accompanying pictures (e.g., Bransford & Johnson, 1972) or simply titles (Schallert, 1976). In either case, the contextual features provide cues which evoke "schemata" or abstract perspectives from the reader´s world knowledge which are then used to comprehend the text. These perspectives also influence recall and comprehension when they are assigned to the reader (Pichert & Anderson, 1977) or when they occur naturally because of the reader´s background (Anderson, Reynolds, Schallert & Goetz, 1977).

In these studies, world knowledge contributes to comprehension by supplying superordinate categories that direct the reader´s inter-

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pretation of more subordinate points. Thus, the reader's perspective in large measure determines the meaning that is attached to the details of the text. However, more specific elements of world knowledge that correspond to the details of the text were not examined. The purpose of recent work by Waern (1977a, 1977b) has been to analyze the reader's existing knowledge as it relates to the facts of the text and then to assess the relationship of existing knowledge to comprehension.

The reader's factual world knowledge may be described as a set of propositions each of which has two properties. First, each proposition either has some truth value or is of undetermined truth value. Propositions that are considered to be more or less true (or false) represent a person's beliefs. Propositions that are undetermined as to their truth value are hypothetical. Second, for each proposition, a contrary or incompatible proposition may be constructed. This is most easily performed by simply negating the original proposition. More subtle contradictions can be constructed by using expressions which may not appear to be different because they require a greater amount of discrimination for their interpretation (e.g., "She left the room" versus "She was put out of the room"). However different the two statements are, a person who perceives an incompatibility between them is said to have discriminated them. Two propositions may be discriminated whether or not they have any truth value. These two aspects of world knowledge will be called "truth value" and "discriminability" respectively.

A text can be thought of as presenting propositions with certain truth values which represent the author's beliefs and which can be discriminated from each other and from related propositions. To comprehend a text, the reader must realize which truth value the author of the text attributes to the different propositions and the reader must discriminate the propositions in the text from others that contradict them to one degree or another. This is true not only for propositions actually in the text but also for propositions implied by the text. Thus, the reader's comprehension as well as the reader's world knowledge can be regarded as having two aspects, a truth value aspect and a discriminability aspect.

Waern (1977b) studied the effect of the truth value and discriminability of beliefs on comprehension. The subjects, who were Swedish university students, rated their agreement or disagreement with statements that were consistent or inconsistent with the text they were to read. Scores on this measure were used to determine the truth value and discriminability of the subjects' beliefs. After reading the passage, the subjects again rated the statements, this time to indicate whether the author would agree or disagree. These scores were used as a measure of the subjects' comprehension of the text. The findings obtained by Waern demonstrated that truth value and discriminability of beliefs contribute substantially to comprehension, in combination accounting for as much as 39 to 50 % of the variance. The research reported here is an attempt to replicate and extend this important part of Waern's findings.

By replicating Waern's research with American undergraduates, the present study could provide a cross-cultural validation of the original findings. The present study also examined the possibility that Waern's results were in part artifactual, i.e., that they were due to the pro-

cedure of having the same subjects rate the same statements twice, once as a measure of beliefs with the subjects themselves as the reference point and later with the author of the text as the point of reference. In addition, this investigation was designed to establish the relative contribution of beliefs to comprehension compared to other reader characteristics such as verbal ability and to assess the effects of the degree as well as the directionality of beliefs on comprehension. Finally, the frequencies of errors associated with the rejection of true statements and the acceptance of false statements were compared.

Waern also found that recall of the main ideas of the text bore little relation to comprehension after reading the text or to beliefs before reading. Neither finding was anticipated. As Waern noted, it is reasonable to expect recall and comprehension to depend on each other. The more the reader can recall of the text, the more accurately he should be able to match the comprehension test item with the appropriate portion of the text. The reverse is also reasonable; the better the reader's comprehension of the text, the better his recall should be.

There are several possible explanations for the failure to obtain a relationship between comprehension and recall. First, the amount of recall may have been so meager that it masked the actual relationship. In the present study, recall of main ideas were scored liberally so that partial recall of main ideas will be counted as correct. Second, main ideas may not be the most useful information for the reader on this comprehension task. Matching test items to the text may depend more heavily on recall of important details of the text. For this reason, free recall protocols were scored for the presence of idea units as well as for main ideas. Finally, it may be that the free recall protocols, however they are scored, are not sensitive to that aspect of memory that is required by the comprehension task. This possibility was examined by ignoring the protocols and comparing comprehension across conditions that made different demands on memory, including the provision of memory supports and a delay between reading the text and taking the comprehension test. If memory does contribute to comprehension, comprehension scores should be higher when the text is available to the readers than in the other conditions.

Invoking superordinate categories of the reader's world knowledge by providing a context (e.g., Bransford & Franks, 1971) or a perspective (e.g., Prichard & Anderson, 1977) for the text does facilitate recall. However, Waern found no relationship between world knowledge as reflected in the reader's beliefs and recall. Particularly because of the positive findings of Bransford and Anderson and their coworkers, it is important to learn if Waern's findings will replicate.

Method

Subjects

Fifty-six college undergraduates volunteered to participate anonymously as subjects. Of this number, 34 were assigned randomly to a group that rated their agreement with propositions that were derived from the experimental texts and that were also used on the test of comprehension. The remaining 22 subjects rated an alternate set of beliefs. Subjects in both groups were assigned randomly to read one

of two passages. One passage described a stimulus-response model of memory and problem solving (SR) and the other a reconstructive model (RC). Six subjects of the original number were not included in the analyses because data from them were incomplete. This left 32 subjects in the text-belief condition, 15 who read the SR text and 17 who read the RC text. There were 18 subjects in the alternate-belief condition, nine who read each passage.

Materials

All materials except the alternate set of beliefs were adopted with only minor changes in wording from translations of those used by Waern (1977b). One of the two passages on the topic of Thinking, Memory, and Problem Solving described the stimulus-response position (SR) and the other a reconstructive position (RC). Both passages were 12 sentences in length and parallel in form. The SR passage is presented below.

Thinking, Memory, and Problem Solving

When solving a problem, the most important task consists of taking out from memory that solution which the special problem demands. It is, in fact, exactly this searching process in the memory which in everyday terms we call "thinking".

Memory can be thought of as a storeroom full of the human being´s impressions of reality. The impressions can be characterized as sense impressions and action impressions. The distinctive feature of a human being´s thinking is that the impressions are bound together with each other according to certain principles. Connections between impressions can arise, for example, when two impressions have occurred simultaneously and they are retained more easily if this process, simultaneous occurrence, is repeated. The connection between sense impressions and action impressions can also be made if a certain action in a certain situation has led to a favourable outcome.

In the process of solving a problem, the problem can be seen as a sense impression and the solution to the problem as an action impression. If a person succeeds in using a certain method of solving a problem, the chance is increased that he will try the same solution the next time he is confronted with a similar problem. If he does not succeed in solving the problem, he is going to have difficulty with similar problems henceforth as well. In short, whether a problem is easy or difficult to solve depends upon whether the person has succeeded in solving similar problems previously. An entirely "new" solution to a problem can only arise by pure chance or by a combination of two or more previous solutions.

The test of the subject´s beliefs contained 24 statements; 12 statements were consistent with the SR text and 12 matching statements were consistent with the RC text. As an illustration, one SR item was: One becomes a better problem solver by succeeding with a problem solution than by failing. The contrasting RC item was: One learns as much from a failure to solve a problem as from a success in doing so. The order of the statements was randomized. The subjects rated the statements on a five point scale composed of: Strongly Disagree, Disagree, No Opinion, Agree, and Strongly Agree. Different random arrangements of the same 24 statements were used as the measures of comprehension. In these instances, the subjects indicated whether the author of the text would

agree or disagree with each statement or whether it was impossible to determine the author's view. The use of the sets of two contrasting statements made it possible to determine the truth value and discriminability of the reader's beliefs and comprehension.

The alternate-belief questionnaire also contained 24 statements that the subjects responded to in the same way as they did on the text belief questionnaire. The 24 statements were 12 pairs of propositions about education; one member of the pair presented an open education position and the other a contrasting traditional view. The statements were adapted from Barth's (1972) list of assumptions about open education.

Procedures

The data were collected in three sessions. In the first session, the subjects completed either the text belief or alternate belief questionnaire.

The second session was conducted approximately two weeks after the first. The subjects were told that there were no time limits for the tasks they were to perform. They were then instructed to read the text at their normal rate and that they would be asked questions about the text after they finished. Then the subjects rated how easy or difficult the passage was to understand on a five point scale. After reading the passage, a free recall test was administered. The subjects were instructed to recall the passage by writing it as close to the original wording as possible. Two versions of the comprehension text were administered. On the first administration, subjects could not refer to the text. On the second, they were told that they were free to consult the text and were encouraged to do so as often as they wished.

The third session was conducted approximately ten days after the second. At that time, the subjects completed the comprehension test without access to the text.

Measures

Beliefs. Several measures of the truth value of beliefs were obtained. The first was Waern's procedure of calculating the difference between the sum of the accepted propositions in the text read by the subject and the sum of the accepted propositions not in that text. For this purpose, the difference between the two levels of agreement was ignored. The second measure was a modification to take into account the degree of agreement. In this instance, the two levels of agreement were included in the sums for the text and nontext propositions by assigning different weights to the agree and strongly agree ratings. The difference between the sums for the accepted propositions in the text and those not in the text was calculated. The third measure takes into account the degree of agreement and disagreement. This measure was obtained by including the two levels of disagreement as well as the levels of agreement in the sums of the text and nontext propositions. The difference between the two sums was again calculated. A discrimination index of beliefs score was obtained for each of the three truth value of belief measures by calculating the absolute value of the differences between the sums of the text and nontext propositions.

Comprehension. Truth value of comprehension was calculated as the difference between the sum of the propositions correctly attributed to the text and the sum of the propositions incorrectly attributed to the text. The discrimination index of comprehension was calculated as the absolute value of the difference between the sum of the propositions correctly attributed to the text and the sum of the propositions incorrectly attributed to the text.

Verbal ability. Scores on the verbal portion of the Scholastic Aptitude Test were used. In cases where the subject took the test more than once, the highest verbal score was selected.

Recall. Free recall protocols were scored for the presence of the eight central ideas used by Waern. A literal scoring procedure required explicit recall of all elements of the main ideas. A more liberal procedure required the recall of the gist of only one element. In addition, both texts were divided into idea units according to a procedure developed by Johnson (1970). Unit boundaries required the agreement of at least 50 % of the 18 judges who rated both texts. The SR text contained 32 units and, coincidentally, the RC text contained 32 units. Protocols were then scored for the presence of the idea units.

Errors. The subjects' responses on the comprehension tests were scored as errors of rejection when they indicated that the author would disagree with a proposition that was in the text or implied by it. Errors of acceptance occurred when subjects attributed to the author a proposition that was not in the text or implied by it.

Results

Comprehension scores were analyzed for their relationship to the readers' world knowledge as represented by the text-belief questionnaires and for their relationship to other factors including the readers' recall of main ideas and the type of errors they made.

Beliefs and Comprehension

Measurement of beliefs. Did the measurement of beliefs affect performance on the comprehension test? Subjects in the text-belief group rated their beliefs about the passage they read using the same items that were on the comprehension test. An alternate-belief group rated their beliefs on a different topic. Comprehension scores for the text-belief and alternate-belief groups were compared to determine the effect on comprehension of rating the same items twice. Analyses of the mean comprehension scores in Table 1 indicate that the higher scores for the text-belief group when the passages are combined can be accounted for by the readers of the SR passage. For the RC passage, at least, comprehension appears to be unaffected by the prior measurement of beliefs.

Table 1. Comparisons of mean comprehension scores immediately after reading for the text-belief and alternate-belief groups

Passage	Mean Text-belief Comprehension	Mean Alternate-belief Comprehension	t-value	p
SR and RC	12.91	11.50	2.05	.04
SR	13.07	10.89	2.36	.03
RC	12.70	12.11	.60	ns

The difference in comprehension between the two belief groups that read the SR passage may not be due to the use of the same items on the belief questionnaire and comprehension text. The delay of two weeks between the administrations of the measures and the different randomizations of the items on each would minimize any artifactual effects. The strongest argument against the artifactual interpretation of the difference is the finding that there is no correlation between truth value of beliefs and comprehension ($r = .02$), i.e., the ratings of the items on the comprehension test were unrelated to earlier ratings of the same items on the belief measure. The difference in comprehension between the SR groups may have occurred because of a corresponding difference in SAT scores ($t = 2.07$, $df = 22$, $p < .05$) that did not occur for the RC passage. This explanation is reinforced by the correlation between SAT and comprehension ($r = .49$, $df = 22$, $p < .01$) for all readers of the SR passage. Thus, what appears to have been an artifact caused by the use of the same items on both measures may reflect, instead, differences in verbal ability between the text- and alternate-belief readers of the SR passage.

The three procedures for scoring the belief questionnaires are all strongly related to each other for the SR passage (Table 2). For the RC passage, the agreement and degree of agreement measures are virtually identical; the measure of agreement and disagreement is less strongly related to the other two measures, although the correlations are substantial and significant. The results of the analyses that included beliefs as a variable are similar regardless of the scoring procedure. In regard to these passages, at least, the degree and directionality of beliefs makes little difference. In order to simplify the presentation of the results, only the second procedure based on the degree of agreement will be reported.

Table 2. Intercorrelations among the truth values and discrimination indices of three measures of beliefs for SR and RC passages[a]

	Beliefs 1[b]		Beliefs 2		Beliefs 3	
	T.V. 1	Disc. 2	T.V. 3	Disc. 4	T.V. 5	Disc. 6
1	X	82[c]	99	85	78	83
2	-15	X	82	98	72	81
3	97	-05	X	86	80	84
4	-13	95	-09	X	75	83
5	92	03	95	00	X	89
6	-23	82	-20	86	-19	X

(a.) Correlations for SR passage (n=15) below diagonal; correlation for RC passage (n=17) above diagonal. (b.) For Beliefs 1, agreement levels are not weighted; for Beliefs 2 they are and for Beliefs 3 levels of both agreement and disagreement are weighted. (c.) All correlation coefficients above .64 are significant at the .01 level. Decimal points omitted.

The correlations between truth values and discrimination indices differed sharply for the two passages (see Table 2). The high, significant correlations in the case of the RC passage suggest that the subjects were in substantial agreement with the text they read. The low, negative correlations for the SR group suggest a tendency for those subjects to disagree with the text they read or at least to be less likely to agree with it. This interpretation is borne out by the finding that the truth value of beliefs for the RC group ($\bar{X}$ = 40.12) was greater than that for the SR group ($\bar{X}$ = 26.53) by a reliable margin ($t = 3.10$, $df = 30$, $p < .01$).

The relationship of beliefs to comprehension. Correlation coefficients for the relationships between beliefs and comprehension are presented in Table 3 for each passage and for the passages combined. None of the correlations between beliefs and the three measures of comprehension for the SR passage are significant. However, for the RC passage, both the truth value and discrimination index of beliefs correlate significantly with the test of comprehension taken immediately after reading the passage. When both passages were combined, the discrimination index again correlated significantly with comprehension. A relationship between beliefs and comprehension when subjects had the text available for consultation during testing was neither expected nor obtained. A relationship was expected for the delayed test of comprehension because it was assumed that the effect of prior beliefs would become more pronounced as memory of the text decayed over the ten-day interval between the administrations of the comprehension tests. The correlations show that this did not happen; beliefs bear little relation to comprehension on the delayed test.

Table 3. Correlations between truth values and discrimination indices of beliefs and of comprehension

Passage group	Belief measure	First comprehension test		Second comprehension test		Third comprehension test	
		T.V.	D.I.	T.V.	D.I.	T.V.	D.I.
SR (n=15)	T.V.	02	01	28	28	02	05
	D.I.	38	40	42	42	13	09
RC (n=17)	T.V.	51*	56**	14	14	20	-11
	D.I.	55*	58**	23	23	-02	-04
Combined (n=32)	T.V.	18	18	15	15	01	-09
	D.I.	45***	48***	30	30	04	01

* $p < .05$
** $p < .02$
*** $p < .01$

Stepwise regressions were computed for each passage separately and for the combined passages to assess the relative importance of beliefs for comprehension compared to memory of the text and the readers' verbal ability. The five independent variables were the truth value and discrimination index of beliefs, verbal ability, and the literal and liberal scoring of recall of main ideas; truth value of comprehension on the test administered immediately after reading served as the dependent variable. The significant outcomes are summarized in Table 4.

Table 4. Significant factors in stepwise regression analyses of truth value of comprehension scores for each passage

Passage group	Explanatory Variable	Constant	Coefficient	R	R^2
RC	Discrimination Index	11.42	.11*	.55	.30
	Truth Value	9.26	.08*	.52	.27
Combined SR & RC	Discrimination Index	11.63	.11**	.45	.20

* $p < .05$
** $p < .01$

The analysis of the SR passage yielded no significant regression coefficients. In the case of the RC passage, the regression coefficients for the discrimination index of beliefs were significant ($F = 6.40$, $df = 1,15$, $p < .025$), accounting for 30 % of the variance in comprehension. None of the other factors were significant. Because the truth value and discrimination index of the RC passage were highly correlated ($r = .86$), an additional regression analysis was conducted

in which the discrimination index was surpassed. This analysis yielded a significant effect for the truth value of beliefs ($F = 5.45$, $df = 1,15$, $p < .05$) which accounted for 27 % of the variance in comprehension. Finally, the analysis based on both passages yielded a single, significant regression coefficient for the discrimination index of beliefs ($F = 7.58$, $df = 1,30$, $p < .001$) which accounted for 20 % of the variation in comprehension. Beliefs, particularly as determined by the discrimination index are a relatively important contributor to comprehension compared to other factors such as memory of the text and verbal ability.

Comprehension, Recall, and Type of Error

No correlation was obtained between recall of the text and comprehension immediately after reading whether recall was measured by the literal or liberal scoring of main ideas or by recall of idea units (see Table 5). When entered into a stepwise regression analysis, none of the measures of recall had a significant effect on comprehension for either passage or for the passages combined. The relationship between memory and comprehension also was analyzed by comparing scores on comprehension tests that took place under conditions that made different demands on memory. If memory were an important factor in this comprehension task, scores on the comprehension test with the text should be higher than on the delayed comprehension test without the text with the immediate test falling between the two.

Table 5. Correlation matrices for truth values of comprehension, recall, and verbal ability for SR and RC passages

First test 1	Second test 2	Third test 3	Recall (Literal) 4	Recall (Liberal) 5	Recall (Idea units) 6	SAT Verbal 7
X	24	48*	19	28	33	49*
17	X	17	-20	-15	-18	00
-35	18	X	27	04	-06	19
17	12	-46*	X	67**	64**	23
16	-02	-40*	27	X	88**	28
18	08	-43*	36	74**	X	42*
33	09	-14	-06	-02	-15	X

Note - Correlations for SR passage (n=24) above diagonal; for RC passage (n=26) below diagonal. Decimal points omitted.

* $p < .05$
** $p < .01$

To test this proposition and another to be described below, a 2 x 2 x 3 ANOVA (passage x type of error x comprehension test) of errors in comprehension was conducted with repeated measures on the last two factors. This analysis yielded a main effect for the comprehension test ($F = 9.30$, $df = 2,84$, $p < .001$). All contrasts were significant according to t-tests set at the .01 level of significance. Errors on the second test when memory support was provided ($\bar{X} = 2.62$) were less than those

on both the first, immediate test ($\bar{X}$ = 4.74) and third, delayed test ($\bar{X}$ = 3.59) which also differed from each other. There were no interactions involving the comprehension test factor.

The superior comprehension scores on the third, delayed test over the first, immediate test may have resulted from the intense instructional effects of the second comprehension test and the free recall tasks. To test this possibility, a small, supplementary study was conducted in which different subjects (n=10) were administered a delayed comprehension test two weeks after reading the RC passage and taking the immediate test. Truth values of comprehension scores on the delayed test when no other reading or testing tasks intervened were poorer than on the immediate test ($t = 10.74$, $df = 9$, $p < .001$), a finding that favors the memory interpretation.

The 2 x 2 x 3 analysis of variance described above yielded a main effect for the type of error ($F = 146.72$, $df = 1,42$, $p < .001$). Readers consistently made more errors by accepting an incorrect statement ($\bar{X}$ = 5.08) than by rejecting a correct one ($\bar{X}$ = .64). There were no interactions. Thus the difference between the two kinds of errors held up even when readers could refer to the text during the comprehension test and again after a delay of ten days. Moreover, the difference between the types of errors is generalizable across the two passages. Since both kinds of errors could be made on the same item, depending on which passage the subject read, the difference in types of errors can not be attributed to differences in item difficulty. Nor can it be attributed to response set. If subjects tended to agree with all or most items, a condition in which errors of acceptance would dominate, the number of SR and RC statements attributed to the texts would be highly correlated. In actuality, the correlation was low and non-significant ($r = -.02$).

Discussion

Waern's (1977b) original finding that beliefs contribute to comprehension was supported by these findings which were obtained in a different cultural setting. Although the amount of variance in comprehension accounted for by beliefs is less than the amount Waern found, it was nevertheless substantial. In fact, the contribution of beliefs to comprehension was greater than that of verbal ability. Furthermore, there is no evidence that the relationship between beliefs and comprehension was artifactual. Thus, along with Waern's original work, the present study demonstrated the importance of the detailed aspects of world knowledge on comprehension.

In contrast to Waern's findings, discriminability of beliefs rather than their truth value had the strongest effect on comprehension. The correlations between the discrimination index and comprehension were relatively large even for the SR passage; for the RC and for the combined passages they were significant. Truth value of beliefs contributed significantly to comprehension only on the RC passage and then only when the discrimination index was surpressed in the regression analysis. Had the truth value of beliefs dominated the relationship with comprehension, one could appeal to consistency theories to account for the apparent assimilation of new information to fit the readers' existing beliefs. The

finding that comprehension is directly related to the readers' ability to differentiate between the SR and RC views prompts an Ausubelian interpretation of the results. The better a reader can differentiate between the SR and RC views, the clearer and more stable are the "anchoring ideas" that are necessary for the reception and retention of new material.

Another finding suggests that the ability to differentiate is an important factor in the present task. This finding consists in the pronounced difference between the two types of comprehension errors. The error of accepting false statements was much more common than the error of rejecting a true one. This difference between the two types of comprehension error was also found by Waern (1977a). This finding is consistent with a discrimination failure interpretation for the following reasons. If readers recognize what the text is about, they will not be likely to err by eliminating true statements from their judgments of the author's viewpoint. If they cannot discriminate between the two different viewpoints, they will err by attributing false propositions to the text. Thus, there will be more incorrect "true" judgments than incorrect "false" ones when the subjects do not make the required discriminations.

Recall may be a necessary but not sufficient condition for comprehension. At low levels of recall, increasing amounts of recall may contribute to increases in comprehension. However, after a certain level of recall is reached, its relative contribution to comprehension lessens and other factors, such as inferences, contribute more heavily. The findings are consistent with this conceptualization. The measure of free recall did not include the negative inferences required in the comprehension measurement and may not have included some positive inferences. As a consequence, the correlation between free recall and comprehension was low. In contrast, the various memory conditions in the analysis of variance did not exclude the influence of other factors, such as inferences, which under any circumstances would be difficult to disentangle from memory effects. Thus, in that analysis memory and inferences may have combined to have produced the changes in comprehension that were obtained.

Finally, previous work has shown that world knowledge influences recall (e.g., Bransford & Johnson, 1972; Schallert, 1976). Here no such relationship was found. The lack of relationship may have to do with the nature of world knowledge studied in this investigation. Beliefs and discriminations between beliefs represent a more fine-grained analysis of world knowledge than the general frames of reference used in the previous work. General frames of reference involve inferences concerning the general topic of the text. These inferences are bound to be reflected in the subjects' free recall by providing a conceptual or organizational framework that makes the details of the text coherent. Belief discriminations, on the other hand, involve only those inferences that are required to make the necessary discriminations, i.e., to reject contradictory propositions. Either these belief-relevant inferences are not drawn at the time of reading or recall or, if they are, they do not have the same facilitative effect on recall as the more general inferences. In either case, world knowledge as represented by beliefs would bear little relationship to recall. According to this interpretation, world knowledge has at least two components, a more general component that has the facilitative effect on recall obtained by Brans-

ford, Anderson, and others and a more detailed component that does not bear as heavily on memory as it appears to bear on comprehension.

In summary, this study demonstrated that detailed aspects of world knowledge, in the form of beliefs contribute to comprehension and in this respect, the present findings replicate those of the earlier investigation (Waern, 1977b). Particularly, the discriminability of beliefs seems to be important, as is evidenced both in the correlations between beliefs and comprehension and in the error pattern. The findings suggest that the contribution of memory to comprehension must be admitted, but the magnitude of that effect is highly qualified by the effects of other factors, most probably, by inferential processes which we assumed to facilitate comprehension and which are difficult to disentangle from memory effects.

References

Anderson, R.C., Reynolds, R.E., Schallert, D.L. and Goetz, E.T. Frameworks for comprehending discourse. American Educational Research Journal, 1977, 14, 367-381.

Barth, R.S. Open Education and the American School. New York: Schocken Books, 1972.

Bransford, J.D. and Franks, J.J. The abstraction of linguistic ideas. Cognitive Psychology, 1971, 2, 331-350.

Bransford, J.D. and Johnson, M.K. Contextual prerequisites for understanding: Some investigations of comprehension and recall. Journal of Verbal Learning and Verbal Behavior, 1972, 11, 717-726.

Johnson, R.E. Recall of prose as a function of the structural importance of linguistic units. Journal of Verbal Learning and Verbal Behavior, 1970, 9, 12-20.

Pichert, J.W. and Anderson, R.C. Taking different perspectives on a story. Journal of Educational Psychology, 1977, 69, 309-315.

Schallert, D.L. Improving memory for prose: The relationship between depth of processing and context. Journal of Verbal Learning and Verbal Behavior, 1976, 15, 621-632.

Waern, Y. On the relationship between knowledge of the world and comprehension of texts: Assimilation and accommodation effects related to belief structures. Scandinavian Journal of Psychology, 1977a, 18, 130-139.

Waern, Y. Comprehension and belief structure. Scandinavian Journal of Psychology, 1977b, 18, 266-274.